

REMARKS/ARGUMENTS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1, 2, 4, 5 and 18 remain active in this case, Claim 1 having been amended by the present amendment, Claims 3, 6-12 and 17 having been previously canceled and Claims 13-16 having been withdrawn from consideration as directed to a non-elected invention.

In the outstanding Office Action, Claims 1, 2, 4, 5, and 18 were rejected under 35 U.S.C. §103(a) as being unpatentable over Cottell (U.S. Patent No. 3,715,104) in view of Muller (U.S. Patent No. 2,615,692).

The present amendment clarifies the structure of the claimed invention, consistent with Applicants' disclosure as shown in Figs. 6 and 9, for example, which illustrate that at least one perforation 74 is formed so as to extend through a center area of the reflector 14 and penetrate the bottom wall 71 of the vessel, and through which the mixture components are fed to a space between the vibrator and the reflector. Thus, according to the claimed invention, in comparison with a structure in which mixture material is introduced into a vessel through a side portion of the gap formed between a vibrating plate and a reflector plate, impact wave can be more easily received, which results in generation of emulsion having more fine composition. No new matter has been added.

In contrast to the claimed invention, in the Cottell structure, material is introduced through side liquid inlet 5 as is clear from the disclosure at column 5, lines 32-33. That is, in Cottell, liquid to be treated is supplied in a space between plates 9 and 10 from a liquid inlet 5 formed to the side of the container.

This Cottell structure differs from the claimed invention in which the mixture material is introduced through the central portion of the bottom wall of the vessel, as recited in the amended Claim 1 and in Claim 18. Therefore, according to the structure taught by Cottell, it

is difficult to introduce the mixture material into the central portion of the vessel at which the impact wave largely functions.

Furthermore, in the claimed invention, the drain pipe 75 is provided for the side wall of the vessel for draining the liquid mixture thereby to make it possible to realize high treating efficiency. In comparison, Cottell discloses an axial outlet 6 is a through hole penetrating the bottom wall of the chamber 3 from the central portion of the plate 10 as disclosed on column 5, lines 32-33. Thus, it is seen that the structure of the material introducing and discharge portions of the Cottell invention is opposite to that of the claimed invention.

Further, in regard to the material introducing and discharge portions of the Cottell invention, the outstanding Office Action in para. 3, lines 10 and 31 refers to “drain pipe 5” of Cottell, which seems to be mistaken because in Cottell the drain pipe should be denoted by reference numeral "6". Moreover, if the outstanding Office Action equates the central hole formed to the vessel bottom portion of the Cottell reference as corresponding to the mixture material perforation (introducing port) of Applicants' invention, then the underpinnings of the outstanding rejection are based on a significant misunderstanding.

Applicants have also reviewed the Muller reference, and this reference is not believed to remedy the deficiencies of Cottell.

That is, in Applicants' view, as previously expressed, Muller fails to clearly disclose that at least one of a surface of the vibrator that faces the reflector and a surface of the reflector that faces the vibrator has a large number of cone-shaped pits for generating shock waves. Such shock waves generated in the pits according to Applicants' invention are converged on focal sections existing between the vibrator and the reflector, and the focal sections form an ultra strong shock wave-generating zone existing between the vibrator and the reflector.

This feature was previously clarified in the claims with the claimed feature that “at least one of a surface of the vibrator that faces the reflector and a surface of the reflector that faces the vibrator has a large number of cone-shaped pits for generating shock waves, the shock waves generated in the pits are converged on focal sections existing between the vibrator and the reflector, and the focal sections form an ultra strong shock wave-generating zone existing between the vibrator and the reflector.”

In response, the outstanding Office Action takes the position that Muller teaches providing a vibrator with cone shaped pits (5). However, this position misunderstands that in the Muller reference, reference numeral (5) denotes tapering holes 5, which are through holes, and these holes 5 function expecting the mixing effect for well mixing upper and lower liquids by communicating these upper and lower liquids in form of jets through the tapering holes 5 by vibrating single plate 4.

As mentioned above, the structure and function taught by the Muller reference quite differ from those of the claimed invention, at the very least because the cone-shaped pits of the present invention are not through holes, but are bottomed pits cone-shaped in section, and impact wave is generated from the inner surface of each pit. To clarify this distinction, amended Claim 1 recites:

(1) The vessel is provided with one or more perforations as inlet ports which extend through a center area of the reflector and penetrate the bottom wall of the vessel, and through which the mixture components are fed to a space between the vibrator and the reflector.

(2) The vibrator and the reflector cooperate to create cavitation bubbles in the mixture components utilizing a decompression action of the vibrator allowed to move away from the reflector by the high-frequency vibration transmitted from the high-frequency vibration generator to the vibrator and also cooperate to break the cavitation bubbles.

(3) The shock wave energy generated by the breaking action extremely reduces the size of the cavitation bubbles and promotes the diffusion of the mixture components.

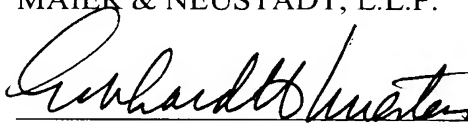
(4) At least one of a surface of the vibrator that faces the reflector and a surface of the reflector that faces the vibrator has a large number of bottomed pits having a cone-shape section for generating shock waves, the shock waves generated in the pits are converged on focal sections existing between the vibrator and the reflector, and the focal sections form an ultra strong shock wave-generating zone existing between the vibrator and the reflector.

Accordingly, even in combination Cottell and Muller fail to teach or suggest the claimed invention, from which Applicants respectfully conclude that the pending claims are patentably distinguishing thereover.

Consequently, in view of the present amendment and in light of the above comments, no further issues are believed to be outstanding, and the present application is believed to be in condition for allowance. An early and favorable action to that effect is respectfully requested.

Respectfully submitted,

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